

Attorney Docket No.: **MGU-0020**  
Inventors: **Polychronakos, Constantin**  
Serial No.: **10/695,014**  
Filing Date: **October 28, 2003**  
Page 3

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (currently amended): A glucose quantification device for determining the concentration of glucose in a liquid medium comprising a reference electrode; a counter electrode and a working electrode with a semipermeable membrane immersed in a liquid medium in which at least one chemical entity is dissolved; a potentiostat for applying a measurement potential to the working electrode relative to the reference electrode corresponding to a measurement voltage during at least a portion of measurement period, and thereby causing said chemical entity to participate in an electrochemical reaction at the working electrode, said electrochemical reaction resulting in ~~a—impedance measurement—evoked—current,~~ an effect on impedance; a measuring unit for ~~said~~ obtaining an impedance measurement evoked current; and a means for comparing said impedance measurement ~~evoked—current—~~ with a ~~predetermined—value~~ calibration standard to obtain a comparison result.

Claim 2 (original): The glucose quantification device of claim 1 wherein the liquid medium is blood.

Claim 3 (original): The glucose quantification device of claim 1 wherein the chemical entity is glucose.

Claim 4 (original): The glucose quantification device of claim 1 wherein the working electrode comprises a

Attorney Docket No.: **MGU-0020**  
Inventors: **Polychronakos, Constantin**  
Serial No.: **10/695,014**  
Filing Date: **October 28, 2003**  
Page 4

semiconductor wherein the semiconductor surface is covered with immobilized Concanavalin A which binds glucose.

Claim 5 (original): The glucose quantification device of claim 4 wherein the semipermeable membrane allows for free diffusion of micromolecules but prevents macromolecules from contacting the Concanavalin A surface.

Claim 6 (original): The glucose quantification device of claim 1 wherein the working electrode is a silicon chip containing at least one surface covered with a thin layer of silicon oxide.

Claim 7 (original): The glucose quantification device of claim 1 wherein the reference electrode is Ag/AgCl.

Claim 8 (original): The glucose quantification device of claim 1 wherein the counter electrode is platinum.

Claim 9 (original): A glucose quantification device of claim 1 further comprising a feedback loop pump which administers an amount of insulin to a patient to modulate the glucose levels

Claim 10 (currently amended): A method of modulating glucose in a patient comprising:

a) immersing a glucose quantification device comprising a reference electrode; a counter electrode and a working electrode with a semipermeable membrane in a liquid medium in which at least one chemical entity is present;

Attorney Docket No.: **MGU-0020**  
Inventors: **Polychronakos, Constantin**  
Serial No.: **10/695,014**  
Filing Date: **October 28, 2003**  
Page 5

b) applying a measurement potential to the working electrode relative to the reference electrode ~~to result in a impedance measurement evoked current~~ resulting in an effect on impedance;

c) measuring said impedance ~~measurement evoked current;~~

d) comparing said impedance measurement ~~evoked current~~ with a ~~predetermined value~~ calibration standard to determine whether the chemical entity in the liquid medium is within a normal range;

e) administering an amount of insulin to the patient to modulate the concentration of the chemical entity in the liquid medium and regulate glucose levels.

Claim 11 (currently amended): The method of claim 10 further comprising the step of determining ~~the  $T_m$~~  a specific DNA sequence melting temperature ( $T_m$ ) by continuously determining the impedance ~~measurement evoked current~~ value over a period of time while increasing the temperature of the liquid medium.